Banana peel and grape stalk: potential of valorization through the evaluation of chemical composition and physical-chemical properties

[1]Denise S. Ruzene, [1]Daniel P. Silva, [1,2]Giovani B. M. Carvalho, [1]António A. Vicente, [2]João B. Almeida e Silva, [1]José A. Teixeira
[1]IBB - Institute for Biotechnology and Bioengineering, Centre of Biological Engineering, Universidade do Minho, 4710-057 Braga, Portugal, email: druzene@deb.uminho.pt;
[2]Biotechnology Dept, Engineering School of Lorena, University of São Paulo, Campus I, P.O.Box116, 12602-810 Lorena/SP, Brazil

Bioconversion of food processing residues (agro-based industrial residues) in valuable products has been receiving an increasing attention in the last years. In fact, the main problem experienced by agro-based industries in several countries is the management of their residues. As a consequence, many research centers and government departments are preparing scientific strategies in order to develop biotechnological processes capable of transforming these residues in new bio-products or as sources of other chemicals. Most of these agro-industrial residues are lignocellulosic materials constituted basically of cellulose, hemicelluloses, and lignin. In particular, banana production is one of the main economic resources of several regions in many countries, an important crop in the tropical and sub-tropical regions and one of the most consumed fruits in the world. Grapes are other of the world's largest fruit crops, mainly grown for direct consumption, grape juice and wine-making processes. These agricultural/industrial activities generate large amounts of residues such as banana fruit peel and grape stalk. Taking in consideration these facts, it is fundamental to know their chemical composition and physical-chemical properties, in order to evaluate perspectives of applications and improvement of procedures towards an efficient utilization of these residues. For this reason, following hydrolysis, the residues obtained were analyzed by HPLC, FTIR, TGA and DSC. Preliminary results indicate the attractiveness of these materials for further applications due to their chemical composition and physical-chemical properties: glucan and xylan contents of banana peel are 23.2 ± 0.2% and 18.9 ± 0.5%, respectively, while grape stalk contains 26.5 ± 1.5% and 16.8 ± 0.4%, respectively. These results are in agreement with those obtained with some other agro-industrial residues. These approaches offer several advantages, since the several fractions obtained from the hydrolysis of these annually produced materials can be applied as raw-materials to reduce the existence of environmentally hazardous situations and/or to increase the supply of energy or chemicals produced from renewable resources.
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